Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P., § 601, 7th ed.

TRANSMITTAL LETTER
TO THE UNITED STATES ELECTED OFFICE (EO/US)
(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FI00/00572	22 June 2000	24 June 1999

TITLE OF INVENTION

___SESSION MANAGEMENT___

APPLICANT(S)

___Mihaly TOTH, Eduardo SAIS___

Box PCT
Assistant Commissioner for Patents
Washington D.C. 20231
ATTENTION: EO/US

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10*
(When using Express Mail, the Express Mail label number is mandatory;
Express Mail certification is optional.)

I hereby certify that, on the date shown below, this correspondence is being:

MAILING

☒ deposited with the United States Postal Service in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

37 C.F.R. § 1.8(a)   **37 C.F.R. § 1.10 ***

☐ with sufficient postage as first class mail.   ☒ as "Express Mail Post Office to Addressee"
                                                    Mailing Label No. _EL627431629US_____ **(mandatory)**

TRANSMISSION

☐ facsimile transmitted to the Patent and Trademark Office, (703) _____-_____.

Debra G. Conrad (signature)

Signature

Date: _December 21_, 2001

Debra G. Conrad

(type or print name of person certifying)

* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness. See § 1.703(f). Consider "Express Mail Post Office to Addressee" (§ 1.10) or facsimile transmission (§ 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

NOTE: To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

WARNING: Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing—See 37 C.F.R. § 1.8.

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 U.S.C. § 371 otherwise the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.494(f).

I. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. § 371:

a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. § 371(f)).

b. ☒ The U.S. National Fee (35 U.S.C. § 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

2. Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
☐*	TOTAL CLAIMS 22	22 −20=	2	× $18.00=	$ 36.00
	INDEPENDENT CLAIMS 4	4 −3=	1	× $84.00 =	84.00
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) +$ 280.00 =				

BASIC FEE**

☐ U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY
Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO:

    ☐ and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 C.F.R. § 1.492(a)(4)) $100.00

    ☐ and the above requirements are not met (37 C.F.R. § 1.492(a)(1)) ....$ 710.00

XX U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY
Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO:

    ☐ has been paid (37 C.F.R. § 1.492(a)(2)) ....$ 740.00

    ☐ has not been paid (37 C.F.R. § 1.492(a)(3)) ..$1,040.00

    XXX where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 C.F.R. § 1.492(a)(5)) .... $ 890.00   890.00

	Total of above Calculations	=1,010.00
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Assertion must be made. (note 37 C.F.R. § 1.27)	−
	Subtotal	
	Total National Fee	$ 1,010.00
	Fee for recording the enclosed assignment document $40.00 (37 C.F.R. § 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".	
TOTAL	Total Fees enclosed	$ 1,010.00

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*See attached Preliminary Amendment Reducing the Number of Claims.

☒ Attached is a ☒ check ☐ money order in the amount of $ 1,010.00

☐ Authorization is hereby made to charge the amount of $ _____

☒ to Deposit Account No. 16-1350

☐ to Credit card as shown on the attached credit card information authorization form PTO-2038.

WARNING: Credit card information should *not* be included on this form as it may become public.

☒ Charge any additional fees required by this paper or credit any overpayment in the manner authorized above.

A duplicate of this paper is attached.

**WARNING:* "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).

WARNING: If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

☐ **Assertion of Small Entity Status**

☐ **Applicant hereby asserts status as a small entity under 37 C.F.R. § 1.27.**

NOTE: 37 C.F.R. § 1.27(c) deals with the assertion of small entity status, whether by a written specific declaration thereof or by payment as a small entity of the basic filing fee or the fee for the entry into the national phase as states:

"(c) Assertion of small entity status. Any party (person, small business concern or nonprofit organization) should make a determination, pursuant to paragraph (f) of this section, of entitlement to be accorded small entity status based on the definitions set forth in paragraph (a) of this section, and must, in order to establish small entity status for the purpose of paying small entity fees, actually make an assertion of entitlement to small entity status, in the manner set forth in paragraphs (c)(1) or (c)(3) of this section, in the application or patent in which such small entity fees are to be paid.

(1) Assertion by writing. Small entity status may be established by a written assertion of entitlement to small entity status. A written assertion must:

(i) Be clearly identifiable;

(ii) Be signed (see paragraph (c)(2) of this section); and

(iii) Convey the concept of entitlement to small entity status, such as by stating that applicant is a small entity, or that small entity status is entitled to be asserted for the application or patent. While no specific words or wording are required to assert small entity status, the intent to assert small entity status must be clearly indicated in order to comply with the assertion requirement.

(2) Parties who can sign and file the written assertion. The written assertion can be signed by:

(i) One of the parties identified in §§ 1.33(b) (e.g., an attorney or agent registered with the Office), §§ 3.73(b) of this chapter notwithstanding, who can also file the written assertion;

(ii) At least one of the individuals identified as an inventor (even though a §§ 1.63 executed oath or declaration has not been submitted), notwithstanding §§ 1.33(b)(4), who can also file the written assertion pursuant to the exception under §§ 1.33(b) of this part; or

(iii) An assignee of an undivided part interest, notwithstanding §§ 1.33(b)(3) and 3.73(b) of this chapter, but the partial assignee cannot file the assertion without resort to a party identified under §§ 1.33(b) of this part.

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(3) Assertion by payment of the small entity basic filing or basic national fee. The payment, by any party, of the exact amount of one of the small entity basic filing fees set forth in §§ 1.16(a), (f), (g), (h), or (k), or one of the small entity basic national fees set forth in §§ 1.492(a)(1), (a)(2), (a)(3), (a)(4), or (a)(5), will be treated as a written assertion of entitlement to small entity status even if the type of basic filing or basic national fee is inadvertently selected in error.

> *(i) If the Office accords small entity status based on payment of a small entity basic filing or basic national fee under paragraph (c)(3) of this section that is not applicable to that application, any balance of the small entity fee that is applicable to that application will be due along with the appropriate surcharge set forth in §§ 1.16(e), or §§ 1.16(l).*

> *(ii) The payment of any small entity fee other than those set forth in paragraph (c)(3) of this section (whether in the exact fee amount or not) will not be treated as a written assertion of entitlement to small entity status and will not be sufficient to establish small entity status in an application or a patent."*

3. ☐ A copy of the International application as filed (35 U.S.C. § 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment. "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

    a. ☐ is transmitted herewith.

    b. ☐ is not required, as the application was filed with the United States Receiving Office.

    c. ☐ has been transmitted

       i. ☐ by the International Bureau.

         Date of mailing of the application (from form PCT/1B/308):

         _____

       ii. ☐ by applicant on _____. *(Date)*

4. ☐ A translation of the International application into the English language (35 U.S.C. § 371(c)(2)):

    a. ☐ is transmitted herewith.

    b. ☐ is not required as the application was filed in English.

    c. ☐ was previously transmitted by applicant on _____. *(Date)*

    d. ☐ will follow.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 5 of 9)

5. ☒ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. § 371(c)(3)):

NOTE: *The Notice of January 7, 1993 points out that 37 C.F.R. § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that: "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36.*

    a. ☐ are transmitted herewith.

    b. ☐ have been transmitted

        i. ☐ by the International Bureau.

          Date of mailing of the amendment (from form PCT/1B/308):

          _____.

        ii. ☐ by applicant on _____. *(Date)*

    c. ☒ have not been transmitted as

        i. ☒ applicant chose not to make amendments under PCT Article 19. Date of mailing of Search Report (from form PCT/ISA/210.):

          __10/31/00__.

        ii. ☐ the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. ☒ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. § 371(c)(3)):

    a. ☐ is transmitted herewith.

    b. ☐ is not required as the amendments were made in the English language.

    c. ☒ has not been transmitted for reasons indicated at point 5(c) above.

7. ☒ A copy of the international examination report (PCT/IPEA/409)

    ☒ is transmitted herewith.

    ☐ is not required as the application was filed with the United States Receiving Office.

8. ☒ Annex(es) to the international preliminary examination report

    a. ☒ is/are transmitted herewith.

    b. ☐ is/are not required as the application was filed with the United States Receiving Office.

9. ☒ A translation of the annexes to the international preliminary examination report

    a. ☐ is transmitted herewith.

    b. ☒ is not required as the annexes are in the English language.

10. ☒ An oath or declaration of the inventor (35 U.S.C. § 371(c)(4)) complying with 35 U.S.C. § 115

    a. ☐ was previously submitted by applicant on _____. *(Date)*

    b. ☐ is submitted herewith, and such oath or declaration

        i. ☐ is attached to the application.

        ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. § 1.70.

    c. ☒ will follow.

II. Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):

    a. ☒ is transmitted herewith.

    b. ☐ has been transmitted by the International Bureau.

        Date of mailing (from form PCT/IB/308): _____.

    c. ☐ is not required, as the application was searched by the United States International Searching Authority.

    d. ☐ will be transmitted promptly upon request.

    e. ☐ has been submitted by applicant on _____. *(Date)*

12. ☒ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98:

    a. ☒ is transmitted herewith.

  Also transmitted herewith is/are:

        ☒ Form PTO-1449 (PTO/SB/08A and 08B).

        ☒ Copies of citations listed.

    b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. § 371(c).

    c. ☐ was previously submitted by applicant on _____. *(Date)*

13. ☐ An assignment document is transmitted herewith for recording.

  A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

_____

_____

_____

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 7 of 9)

14. ☒ Additional documents:

    a. ☐ Copy of request (PCT/RO/101)

    b. ☒ International Publication No. _WO 01/01244 A1_

        i. ☒ Specification, claims and drawing

        ii. ☐ Front page only

    c. ☒ Preliminary amendment (37 C.F.R. § 1.121)

    d. ☐ Other

_____

_____

_____

15. ☒ The above checked items are being transmitted

    a. ☒ before 30 months from any claimed priority date.

    b. ☐ after 30 months.

16. ☐ Certain requirements under 35 U.S.C. § 371 were previously submitted by the applicant on _____, namely:

_____

_____

_____

_____

_____

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: *Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.*

NOTE: *"A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).*

NOTE: *"Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).*

☒ Please charge, in the manner authorized above, the following additional fees that may be required by this paper and during the entire pendency of this application:

    ☒ 37 C.F.R. § 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: *Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.*

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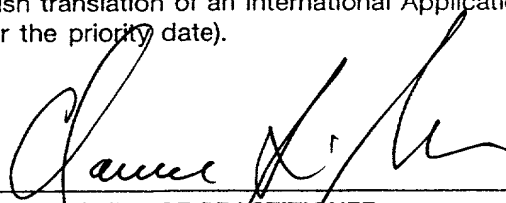☒ 37 C.F.R. § 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: *Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.*

☒ 37 C.F.R. § 1.17 (application processing fees)

☒ 37 C.F.R. § 1.17(a)(1)–(5) (extension fees pursuant to § 1.136(a).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: *Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).*

NOTE: *37 C.F.R. § 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.*

☒ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).

SIGNATURE OF PRACTITIONER

Reg. No.: 24,622

Tel. No.: (203) 259-1800

Customer No.: 2512

Clarence A. Green

(type or print name of practitioner)

PERMAN & GREEN, LLP

P.O. Address

425 Post Road, Fairfield, CT 06430 USA

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Express Mail No.: EL627431629US

Applicant (s): TOTH et al.

INTERNATIONAL APPLICATION NO.: PCT/FI00/00572

INTERNATIONAL FILING DATE: 6/22/00

U.S. SERIAL NUMBER:

TITLE: SESSION MANAGEMENT

ATTORNEY DOCKET NO.: 442-010757-US(PAR)

Box PCT
Commissioner of Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

Please amend the above-identified, patent application
as follows:

IN THE SPECIFICATION:

After the Title and before the first paragraph, please
insert the following new paragraph:

This application claims the benefit of the earlier
filed International Application No. PCT/FI00/00572,
International Filing Date, June 22, 2000, which
designated the United States of America, and which
international application was published under PCT
Article 21(2) in English as WO Publication No. WO
01/01244 A1.

IN THE CLAIMS

Please amend claims 4, 5, 6, 9, 10, 12, 13, 15, 16 and 17 that are included in the Preliminary Examination Report as amended sheets as rewritten below:

4. A method according to claim 1 in which one group (72) is provided for each thread (74) so that there are equal numbers of groups (72) and threads (74).

5. A method according to claim 1 in which sessions are assigned statically to particular threads (74).

6. A method according to claim 1 in which a session is put into a first group in a first time period before suspension and put into a second group in a second time period following resumption.

9. A method according to claim 1 in which each group (72) has a queue (80) and each session puts its events into that queue (80).

10. A method according to claim 1 in which the sessions are grouped by a thread referred to as an acceptor thread (76).

12. A method according to claim 1 in which the sessions are long-lived.

13. A method according to claim 1 in which the terminals (2) comprise mobile terminals.

3

15. A method according to claim 1 in which load balancing means is included in the assignment mechanism of the session.

16. A method according to claim 1 in which the sessions (66) involve obtaining information or conducting transactions through the Internet.

17. A method according to claim 1 in which the sessions are part of the Wireless Session Protocol (WSP).

REMARKS

In accordance with 37 C.F.R. §1.121 (as amended on 11/7/2000) the rewritten claim(s) above are shown on separate page(s) marked up to show all the changes relative to the previous version of that section.

Respectfully submitted,

_____   _____
Clarence A. Green   Reg. No.: 24,622   Date
PERMAN & GREEN, LLP
425 Post Road, Fairfield, CT 06430
(203) 259-1800
Customer No.: 2512

Application entitled: SESSION MANAGEMENT

Marked Up Claims:

4. A method according to ~~any preceding~~ claim 1 in which one group (72) is provided for each thread (74) so that there are equal numbers of groups (72) and threads (74).

5. A method according to ~~any preceding~~ claim 1 in which sessions are assigned statically to particular threads (74).

6. A method according to ~~any of claims 1 to 4~~claim 1 in which a session is put into a first group in a first time period before suspension and put into a second group in a second time period following resumption.

9. A method according to ~~any preceding~~ claim 1 in which each group (72) has a queue (80) and each session puts its events into that queue (80).

10. A method according to ~~any preceding~~ claim 1 in which the sessions are grouped by a thread referred to as an acceptor thread (76).

12. A method according to ~~any preceding~~ claim 1 in which the sessions are long-lived.

13. A method according to ~~any preceding~~ claim 1 in which the terminals (2) comprise mobile terminals.

15. A method according to ~~any preceding~~ claim 1 in which load balancing means is included in the assignment mechanism of the session.

16. A method according to ~~any preceding~~ claim 1 in which the sessions (66) involve obtaining information or conducting transactions through the Internet.

17. A method according to ~~any preceding~~ claim 1 in which the sessions are part of the Wireless Session Protocol (WSP).

SESSION MANAGEMENT

The present invention relates to management of sessions between a server and a plurality of terminals and is particularly, but not exclusively, related to management

5   of sessions between a server and a plurality of mobile terminals. It is particularly suitable for a mobile protocol for enabling a mobile terminal to access the Internet.

The term "Internet" is commonly used to describe information, content, which can be accessed using a terminal, typically a PC, usually connected via a modem, to a

10 telecommunications network. The content can be stored at many different sites remote from the accessing computer, although each of the remote sites is also linked to the telecommunications network. The content can be structured using Hypertext Mark-up Language (HTML). The Internet is made workable by the specification of a standard communications system which makes use of a number

15 of protocols, such as the Transfer Control Protocol (TCP), the User Datagram Protocol (UDP), and the Internet Protocol (IP), to control the flow of data around the numerous different components of the Internet. TCP and UDP are concerned with the transmission of Internet data with different quality of service characteristics, such as in-order, reliable delivery of data, or unreliable delivery of

20 independent data packets. IP is concerned with the structuring and routing of data. On top of that, other application specific protocols may be provided to manage and manipulate the various kinds of information available via the Internet, for example HTTP to access HTML content, FTP to access files or SMTP to access e-mail.

25 The Internet is physically constructed from a hierarchy of telecommunication and data communication networks, for example local area networks (LANs), regional telephone networks, and international telephone networks. These networks are connected internally and externally by so-called "routers" which receive data from a source host, or a previous router in a transmission chain, and route it to the

30 destination host or the next router in the transmission chain.

US 5 835 705 discloses a method and a system for performance measuring within a multithreaded processor. The system includes a processor responsive to instructions within first and second threads and a performance monitor that separately records a first event generated by the processor in response to the first
5   thread and a second event generated by the processor in response to the second thread. The performance monitor comprises first and second counters which are incremented in response to occurrences of the first and second events respectively.

10   US 5 850 399 discloses a method of scheduling transmission of packets from a plurality of sessions. A session is grouped into one of a plurality of classes depending on the quality of service (QoS) which is provided for that session.

With increased use of mobile cellular telephones, there is a growing demand for so-called mobile Internet access, in which access is made from a portable computer connected to a cellular telephone or from an integrated computer/cellular phone device. Typically, the purpose of such access is to obtain content from the

5   Internet. It has also been proposed to provide Internet access to advanced mobile terminals, so-called communicators and smart phones, by means of the Wireless Application Protocol (WAP), for example. WAP has an architecture in which an application layer (called the Wireless Application Environment or WAE) uses a protocol stack comprising a session layer (called the Wireless Session Protocol or

10   WSP), a transaction layer (called the Wireless Transaction Protocol or WTP), a security layer (called Wireless Transport Layer Security or WTLS) and a transport layer (called the Wireless Datagram Protocol or WDP). Each of the layers of the architecture is accessible by the layers above as well as by other services and applications. These protocols are designed to operate over a variety of different

15   bearer services. A specification describing this architecture and the protocol layers is available from http//www.wapforum.org/.

Obtaining access to the Internet generally involves having sessions between a terminal, such as a mobile terminal, and a server. A session is a series of

20   interactions between a terminal and a server having a well-defined beginning and end and involving agreed-upon characteristics. Typically, a session involves a peer announcing to another peer a desire to establish a session, both peers negotiating the characteristics of the session, the peers engaging in a variety of transactions and one of the peers ending the session. The characteristics which

25   are negotiated are typically the length of packets to be exchanged, the character sets which can be understood and manipulated and the versions of protocols which are to be used. A transaction is a basic unit of interaction and may include requesting and receiving information, aborting an ongoing session and informing a peer of a situation in an on-going session. All session operations to establish and

30   terminate a session as well as all transactions result in events being generated and received by the peer. There are many event sources (sessions and transactions).

3

The operations which an application can invoke to generate events are called service primitives. Service primitives represent the logical exchange of information and control between a protocol layer and another entity using it, and especially

5   between the session layer and the application environment (WAE). They consist of commands and their respective responses associated with the particular service provided. Invoking a service primitive in a peer on one side of a communication link results in an event being generated in a peer in the other side of the link. Service primitives are present in all communication protocols and form the basis

10   for specification formalisms used by the ITU-T and ETSI.

An active session can involve multiple transactions and so can generate multiple events. Depending on the speed at which an application can process events coming from its peer, it can happen that there are more transactions than it can

15   process and so it receives more events than it can process. In this case, the events are queued up and wait to be processed within the context of that session. Events connected or related to the same session generally need to be processed in a specific order. In some protocols, a session can be suspended, in which state no transactions are allowed except a request to resume or to terminate the

20   session.

In WAP, communication between layers is also accomplished by means of service primitives.

25   Most transactions are either of the push type or of the pull (request-reply) type. In push type transactions a peer sends information which has not been specifically requested and in pull type transactions, a peer specifically requests to receive information from another peer.

30   Terminals, such as personal computers, obtain information from the Internet through a server, such as a gateway server. The Internet uses HTTP which is a simple request-reply protocol. Almost the only events are an HTTP request and its

associated response. The operating system of the server runs a number of applications and so creates a number of threads to deal with them, for example proxies and mail servers. The applications use the available threads as they are required. In the case of Internet access by a PC, it is convenient to create a thread

5   in the server dynamically to deal with each request because the requests are independent from each other. Once the request has been processed, the thread has finished its activity and is terminated. Creating and terminating threads is a big overhead to the server.

10   A thread is basically a path of execution through a program and can be the smallest unit of execution that is scheduled on a processor. A thread consists of a stack, the state of the CPU registers, and an entry in the execution list of the system scheduler.

15   A thread is a single sequential flow of execution in program code and has a single point of execution. To deal with a simple process, a program comprising a single thread can be used. For more complex processes which involve running a number of applications, a program can rely on a number of threads. Operating systems usually provide thread management for the application (creation, termination and

20   specifying the entry point: at the start of the program code).

A process consists of one or more threads and the code, data, and other resources of a program in memory. Typical program resources are open files, semaphores, and dynamically allocated memory. Each thread shares all of the

25   resources of the process. A program executes when the system scheduler gives one of its threads execution control. The scheduler determines which threads should run and when they should run. Threads of lower priority may have to wait while higher priority threads complete their tasks. On multiprocessor machines, the scheduler can move individual threads to different processors to "balance" the

30   load on the central processing unit.

5

Each thread in a process operates independently. Unless they are made visible to each other, the threads execute individually and are unaware of the other threads in a process. Threads sharing common resources, however, must co-ordinate their work, for example by using semaphores or another method of inter-process
5   communication.

In a communication system comprising a gateway server and a plurality of mobile terminals, establishing a session requires a relatively large amount of bandwidth because a terminal and a server must negotiate many characteristics relevant to
10   the session. Furthermore, information which is unique to a particular opened session may be lost if the session is terminated. This unique information could have been negotiated as a result of transactions. For example, it may be the status of a game. In order to avoid opening and closing sessions on demand and establishing new sessions whenever they are needed, the sessions may be kept
15   open for a long time, even in an inactive state, so that they can be resumed when needed. A session can remain open for days or even weeks until it is closed or until the terminal no longer receives power, for example from a battery. The state of a session can be preserved and kept alive even after switching the terminal off. In this case, the session state can be saved to persistent memory or a SIM card
20   before turning the power off. Of course, although the session is still alive, is not active afterwards. As a consequence, a gateway server serving a large number of mobile terminals needs to be able to manage a very large number of sessions indeed. The gateway may serve tens of thousands of mobile terminals or even in the region of a million mobile terminals. Generally a mobile will have one session
25   open at one time (although there may be more), and so there can be in the region of one million sessions open at one time on the server.

An application in the server will use the operating system thread management service and create a number of threads to manage these sessions. However, a
30   gateway server has difficulty dealing with such a large number of sessions. The number of event sources is much larger than the number of threads. Since most of the sessions are inactive, only a fraction of them have events at any particular

6

time. Therefore assigning one thread to each session is an inefficient use of system resources. On the other hand, having only one thread to handle all events of all sessions is also inefficient because the thread may not process the events more quickly than they are generated in the protocol stack.

5

If several threads are allocated to the same session, then there is a risk that two events of the same session can be dealt with by the same thread at the same time or that the same session can be designated to two different threads at the same time. If two events of the same session are processed concurrently by different

10   threads, this may result in inconsistencies. For example, resumption of a session might be processed faster than its suspension (even though the suspension instruction arrived before the resumption instruction). Alternatively, there may be a code fraction which handles the suspension of a session and a code fraction which handles the resumption of that session. These fractions are in the server

15   application. If both code fractions are able to modify the same data area concurrently so that one thread runs the suspension one thread runs the resumption, this could cause inconsistent data structures since the data would be manipulated by both code fractions at the same time. It is difficult to provide programs which are able to deal with such inconsistencies.

20

According to a first aspect of the invention there is provided a method of managing a plurality of sessions the sessions being between a plurality of terminals and a server having a plurality of threads, the method comprising:
grouping the sessions into a plurality of groups; and

25   assigning a thread to each group of sessions.

The invention is able to optimise the load of the system handling the communication by reducing the number of threads needed to process the various sessions. It can also enable spreading the load of sessions across the threads. As

30   a result, a huge numbers of sessions can be dealt with.

7

Preferably the grouping step occurs when a session is created. Alternatively it occurs when a session becomes active. Preferably the sessions are grouped by a thread, referred to as an acceptor thread.

5   According to a second aspect of the invention there is provided a server for managing a plurality of sessions with a plurality of terminals the server comprising a plurality of threads, grouping means to group the sessions into a plurality of groups and assigning means to assign a thread to each group of sessions.

10   The term server includes origin servers where a resource resides or is created, gateways (servers acting as intermediaries for origin servers), proxies (intermediaries between any kinds of servers) and combinations of origin servers, gateways and proxies. A gateway is a node between two or more networks or between two parts of the same network which use different communication
15   protocols.

In one particular embodiment, the invention comprises a gateway server serving a plurality of mobile terminals. It may be a WAP-HTTP gateway. For example, commands, such as WAP requests, may be sent to a WAP/HTTP gateway. The
20   gateway will interpret these as WAP network packets and will perform the necessary HTTP transactions on an origin server. After that it sends back the result.

According to a third aspect of the invention there is provided a communications
25   system comprising a server and a plurality of terminals the server and the terminals conducting a plurality of sessions the server comprising a plurality of threads, grouping means to group the sessions into a plurality of groups and assigning means to assign at least one thread to each group of sessions.

30   Preferably, the invention relates to long-lived sessions, in some cases some of the sessions are alive for as long as months.

Preferably one group is provided for each thread so that there are equal numbers of groups and threads. The thread assigned to each group only handles the events of the sessions of that group. This prevents two events of the same session being handled by two different threads. The invention allows one thread to be used to

5   deal with many sessions whilst avoiding inconsistencies that can otherwise arise in processing events concurrently. In an alternative embodiment a session can be put into a first group in a first time period before suspension and put into a second group in a second time period following resumption. The second group can be chosen randomly or on the basis of pre-determined selection criteria, for example

10   based upon the relative levels of activity of the groups.

Preferably each group has a queue and each session (and transactions of that session) puts its events into that queue. The events may be dealt with in an order determined by the time at which they are generated.

15

In one embodiment of the invention, the sessions associated with an application are contained within a meta-session. On creation of a new session, a special thread, referred to as an acceptor thread may receive a notification message from the meta-session. The acceptor thread may call a function which may be

20   answered by notification that a new session has been created. Preferably the new session is then assigned to a particular session group by the acceptor thread. After that, the events of that session may be sent to, and dealt with by, the thread assigned to that group. Therefore, the server can control the assignment mechanism of the sessions and select such load balancing mechanism as is

25   desired or is appropriate, for example circular assignment. This provides the advantage that the load can be spread among the threads.

In a method according to the invention, it is not necessary to create threads dynamically when there are events in a session group. A thread can simply be

30   assigned to a session group and wait until there are events to be processed. The thread may call a blocking function which returns with the next event to be processed.

Typically there may be a few, several tens of, one hundred or several hundred threads. The number of threads is chosen to optimise resource usage of a machine. There may be a single processor or tens of processors.

5

Preferably the terminals comprise mobile terminals. Most preferably the terminals comprise cellular telephones.

Preferably the sessions involve obtaining information or conducting transactions.
10 Most preferably they occur between the terminals and sources obtainable through public networks, such as through the Internet.

Preferably the sessions are part of a communication protocol. Most preferably the sessions are part of the Wireless Session Protocol (WSP). However, the invention
15 is not restricted to WSP, and may be of general applicability.

According to a fourth aspect of the invention there is provided a computer program product for managing a plurality of sessions the sessions being between a plurality of terminals and a server having a plurality of threads, comprising:
20 computer readable program means for grouping the sessions into a plurality of groups; and
computer readable program means for assigning a thread to each group of sessions.

25 Preferably the computer program product is stored on a computer readable medium.

The invention allows simple applications which do not require mutual exclusions and other mechanisms to protect the sessions, events, associated queues and
30 related information and data structures from concurrent access. Therefore, the invention provides high performance because there is no need to provide a complex computing mechanism which would slow delivery of the events. It

ensures that events of a session can be handled only by one particular thread and consistent handling of data occurs.

In the case of a protocol which allows long-lived sessions, grouping provides a
5   solution for gaining extra performance from statically creating threads, that is, where a fixed or limited number of threads is available.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which:
10   Figure 1 shows a communication system;

Figure 2 shows a gateway server embodied in hardware;

Figure 3 shows an arrangement of protocol stacks; and

Figure 4 shows an arrangement of threads in an application program and sessions in a protocol stack.
15

In the following example, communication is described with reference to the Wireless Application Protocol (WAP) mentioned above. It should be noted that the invention is not limited to the use of WAP and other protocols and specifications may be used.
20

Figure 1 shows a communication system comprising a plurality of mobile terminals 2 having access to the Internet 4. The mobile terminals transmit signals 6 which are received by and transmitted through a wireless network 8. The signals comprise wireless mark-up language (WML) and WAP commands according to
25   WAP. WML is a tag-based display language providing navigational support, data input, hyperlinks, text and image presentation, and forms. It is a browsing language similar to HMTL. Signals 10 received by the network 8 are routed to a proxy or gateway server 12. The server 12 translates WAP requests into HTTP requests and thus allows the mobile terminals 2 to request information from a web
30   server 14 and thus browse the Internet 4. Information obtained from the web server 14 is encoded by the gateway into a suitable format and then transmitted by the wireless network to the mobile terminal 2 which requested it. The mobile

terminal 2 processes and uses the information. If the web server 14 provides content in WAP/WML format, the server 12 can retrieve such content directly from the web server 14. However, if the web server provides content in WWW format (such as HTML), a filter may be used to translate the content from WWW format to

5   WAP/WML format.

The Wireless Application Protocol is applicable to a number of different systems including GSM-900, GSM-1800, GSM-1900, CDMA IS-95, TDMA IS-136, wide-band IS-95 and third generation systems such as IMT-2000, UMTS and W-CDMA.

10

Although Figure 1 shows information being obtained from the Internet, the gateway itself may contain the desired information. For example, the client may retrieve information from the file system of the gateway.

15   In addition to the web server 14, the mobile terminals may communicate with a wireless telephony application (WTA) server 18.

Figure 2 shows a gateway server embodied in hardware such as a computer 20. The computer 20 has dynamic memory, processing power and memory to store all

20   of the programs needed to implement the gateway server such as the application program, the protocol stacks and the operating system. The computer 20 comprises a user interface such as a keyboard 22 and a display (not shown) and a server program 24. The server program 24 has an application program 26 for processing events of the underlying protocol, such as handling a request to

25   retrieve WML from a server, and protocol stacks such as a WAP protocol stack 28 and a HTTP protocol stack 30. The application program 26 controls flow of data, including commands, requests and information, between the computer and various networks including a telephone network 32, the Internet 34 and a data network and circuit switched data networks 35. The computer 20 communicates with the

30   Internet 34 through the HTTP protocol stack 30 and an interface 36. The computer 20 communicates with the telephone network 34 and the data network 35 through interfaces 38 and 40. The server program 24 also comprises an application 42

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which converts between HTTP and WAP. SMS messaging may be provided via a data connection through appropriate hardware to the operator's network.

Individual threads 44 present in the application program 26 and the WAP protocol
5   stack 28 use processors 46 in the computer 20 to carry out necessary processing tasks. Allocation of threads to processors is provided by threading services 48 present within the operating system 50 of the computer 20.

It will be understood that the WAP stack is built on top of so-called bearers (which
10   provide datagram services). These bearers can be, for example, SMS or CSD. The bearers have their own protocol and are implemented through protocol stack implementations. This is shown in Figure 3.

Figure 4 shows an arrangement of threads in an application program and sessions
15   in a protocol stack. The application program, the threads, the protocol stack and the sessions are present within a server such as that described in Figure 2. As mentioned above, at any one time there can be a large number of sessions open between the gateway server and mobile terminals. For the sake of clarity only a few of these sessions are shown in Figure 4. For the sake of illustration, a
20   boundary line 60 is shown separating the application program 62 and the protocol stack 64.

Within the protocol stack 64 there is a meta-session 66 which contains all of the sessions which are currently being dealt with by the server. The sessions are
25   either assigned 68 or are unassigned 70. Assigned sessions 68 are arranged into a plurality of groups 72. Within the application program 62 are a number of thre ds 74 which handle particular groups. There is also an acceptor thread 76. In ..iis Figure, the individual sessions of groups 72A and 72B are shown. When a session is created it is unassigned. The acceptor thread 76 receives a notification
30   message, or a function call, and then assigns the unassigned session to a particular session group and hence to a particular thread 74 in an assignment step

13

78. The arrangement produces a number of separate groups, each of which is assigned to a particular thread.

Once the session has then been assigned, events of that session will be sent to,
5   and dealt with, the thread assigned to that group. Consequently, events arising in a particular group are only dealt with by the thread assigned to it. The application can control the assignment mechanism of the sessions and select such load balancing mechanism as is desired or is appropriate, for example circular assignment. In this way, the threads are used efficiently.

10

Each group is provided with a queue 80 which contains events arising in that group. Since the thread to which the group is assigned is able to access the queue to deal with the events contained within it, the events connected to a particular session are dealt with in the correct order, for example suspension of a session is
15   executed before resumption of that session. Therefore, the invention limits the risk of errors arising in events being processed concurrently.

The events can include indications and confirmations transferred between an application and the protocol stack. They can also include pseudo-events which
20   trigger state changes within the protocol stack or within the layers of the stack. Examples of session related events and their meanings are given below:

- Connect.ind. When a client attempts to establish a session, Connect.ind is the event that the server receives which indicates what the client wants. The corresponding event in the client indicating that the server accepts the
25   establishment of a session is Connect.cnf.

- Suspend.ind. This is the event received by a peer when the other peer wants to suspend a session.

- Resume.ind. When a client attempts to resume a session, Resume.ind is the event that the server receives which indicates what the client wants.
30   The corresponding event in the client indicating that the server accepts the resumption of a session is Resume.cnf.

- Exception.ind. This relates to an exceptional event in the communication or in the protocol stack.

- Disconnect.ind. The session is terminated and no further communication can occur in the context of this session.

5   Examples of MethodInvoke transaction related events and their meanings are given below:

- MethodInvoke.ind. This is the event received by the server indicating that the client is requesting execution of a method (for example GET). The client receives the corresponding event MethodResult.ind.

10   - MethodResult.cnf. This is the event received by the server acknowledging that the client has received the result. The transaction is completed.

- MethodAbort.ind. This is the event received by one peer when the other peer requests termination of the transaction.

Confirmed push transaction related events:

15   - ConfirmedPush.cnf. This is the event received, typically by the server, that the other peer, typically the client, has received event ConfirmedPush.ind.

- PushAbort.ind. This is the event received by a peer to indicate that a push transaction has been aborted.

These events are described in the specification for WSP.

20

The sessions are long-lived and not active all the time. If a session is assigned to a group only when it is created, the distribution of sessions to groups is static. This can lead to inefficient thread utilisation. In another embodiment of the invention, the acceptor thread assigns inactive sessions to groups when they are resumed

25   (at that point there are no any other events for that session which need to be processed). As a result more dynamic session assignment is provided and thus more efficient session management. Inactive sessions are resumed by sending a message (or event) that the session is to be resumed.

30   In a further embodiment, the sessions are organised into a tree hierarchy such that the sessions are organised into groups and the session groups are themselves organised into further groups. Some nodes in the session tree (session nodes) can

be specified as those which handle events and other nodes can be specified as those which transfer the events to nodes in which they will be handled. This allows ready customisation of how the sessions are handled. Events flow upwardly from the sessions and are pooled in the nodes specified to handle them, and so are

5 placed in a queue and then given to the application. Therefore each node which gets an event from below either puts it into its queue or transfers it upwards.

In a further embodiment, sessions are not assigned to particular session groups but are allocated to a range of groups. However, when activities of the session

10 need to be dealt with, it is assigned to a particular group. For example, a session may initially be assigned to the range of groups 3, 4, 5, and 6. In dealing with a particular activities, for example particular events, the session is assigned to group 4 and all of its events are put into group 4. The session then becomes inactive for a while, that is, it does not generate any events. When the session becomes active

15 again, it may be assigned to another group of its range 3, 4, 5 and 6, for example the least loaded group. The least active group can be selected by the protocol stack automatically. If this is group 5 the session is assigned to group on re-activation. In this way, the session is not fixed to a particular group and can switch between groups.

20

The connection set-up request or the session request (also referred to as connect indications) can also be assigned to a range of groups. It is referred in the WSP specification as S-Connect.ind abstract primitive. This embodiment allows efficient use of threads and rapid assignment of sessions. Furthermore, it eliminates the

25 need for a special (acceptor) thread. In this embodiment selection is done by the stack itself in choosing the range of groups for a particular session. It should be noted that in this embodiment, the application cannot control the assignment of sessions to particular groups, for example to select the least loaded group and the implementation of the protocol stack is more complex. Notifications which are

30 handled by the acceptor thread in the other embodiments will be produced in groups and are handled by regular working threads.

In yet a further embodiment, instead of having threads to invoke blocking functions to handle events, the processing of events can be based on call-backs. In this case, the protocol stack itself invokes a function in the application thread to deliver the event.

5

The invention is located in the Application Programming Interface (API). Referring to Figure 2, the API is present between the application program 26 and the WAP protocol stack 28. The API provides the protocol services to the application. The API is a concrete way for the application to receive events from the protocol and to

10 invoke the service primitives of the protocol.

The invention is particularly suited for protocol implementations in which:

(i)   the protocol entity generates such events that must be processed in the order of their generation, that is their processing cannot be made parallel;

15 (ii)   the application built on top of the implementation is multi-threaded;

(iii)   there are long living protocol entities with long inactive periods which makes it difficult to afford one thread for each entity.

Particular implementations and embodiments have been described. It will be clear

20 to a person skilled in the art that the invention is not restricted to details of embodiments presented above, and can be implemented in other embodiments without deviating from the characteristics of the invention. For example, although the foregoing is a description of mobile terminals browsing the Internet, it is to be understood that the communication may be of different types including sending

25 and receiving information, conducting transactions such as financial transactions sending and receiving electronic mail or messages. The range of activities includes accessing services, for example weather reports, news, stock prices, flight schedules, downloading ringing tones, banking services including information provision and payments. It may occur in communications environments other than

30 the Internet. The scope of the invention is only restricted by the attached patent claims. Equivalent implementations are also within the scope of the invention.

Claims

1. A method of managing a plurality of sessions (66) the sessions being between a plurality of terminals (2) and a server (20) having a plurality of threads (74), the
5   method comprising:
grouping the sessions into a plurality of groups (72); and
assigning a thread (74) to each group (72) of sessions so that the assigned thread (74) only handles the events of that group of sessions.

10   2. A method according to claim 1 in which grouping occurs when a session is created (70).

3. A method according to claim 1 in which grouping occurs when a session becomes active.
15

4. A method according to any preceding claim in which one group (72) is provided for each thread (74) so that there are equal numbers of groups (72) and threads (74).

20   5. A method according to any preceding claim in which sessions are assigned statically to particular threads (74).

6. A method according to any of claims 1 to 4 in which a session is put into a first group in a first time period before suspension and put into a second group in a
25   second time period following resumption.

7. A method according to claim 6 in which the second group is chosen on the basis of the relative levels of activity of the groups.

30   8. A method according to claim 6 in which the second group is chosen randomly.

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9. A method according to any preceding claim in which each group (72) has a queue (80) and each session puts its events into that queue (80).

10. A method according to any preceding claim in which the sessions are grouped
5   by a thread referred to as an acceptor thread (76).

11. A method according to claim 10 in which the acceptor thread (76) calls a function which is answered by notification that a new session has been created and then assigns the new session to a particular session group (72).

10

12. A method according to any preceding claim in which the sessions are long-lived.

13. A method according to any preceding claim in which the terminals (2) comprise
15   mobile terminals.

14. A method according to claim 13 in which the terminals (2) comprise cellular telephones.

20   15. A method according to any preceding claim in which load balancing means is included in the assignment mechanism of the session.

16. A method according to any preceding claim in which the sessions (66) involve obtaining information or conducting transactions through the Internet.
25

17. A method according to any preceding claim in which the sessions are part of the Wireless Session Protocol (WSP).

18. A server (20) for managing a plurality of sessions with a plurality of terminals
30   (2) the server (20) comprising a plurality of threads (74), grouping means to group the sessions into a plurality of groups and assigning means to assign a thread to

AMENDED SHEET

each group of sessions so that the assigned thread (74) only handles the events of that group (72) of sessions.

19. A server (20) according to claim 18 comprising a gateway server serving a
5   plurality of mobile terminals (2).

20. A server (20) according to claim 19 comprising a WAP-HTTP gateway.

21. A communications system comprising a server (20) and a plurality of terminals
10   (2) the server (20) and the terminals (2) conducting a plurality of sessions (66) the server comprising a plurality of threads (74), grouping means to group the sessions into a plurality of groups and assigning means to assign at least one thread to each group of sessions so that the assigned thread (74) only handles the events of that group (72) of sessions.
15

22. A computer program product for managing a plurality of sessions (66) the sessions being between a plurality of terminals (2) and a server (20) having a plurality of threads (74), comprising:
computer readable program means for grouping the sessions (66) into a plurality
20   of groups (72); and
computer readable program means for assigning a thread to each group (72) of sessions so that the assigned thread (74) only handles the events of that group (72) of sessions.
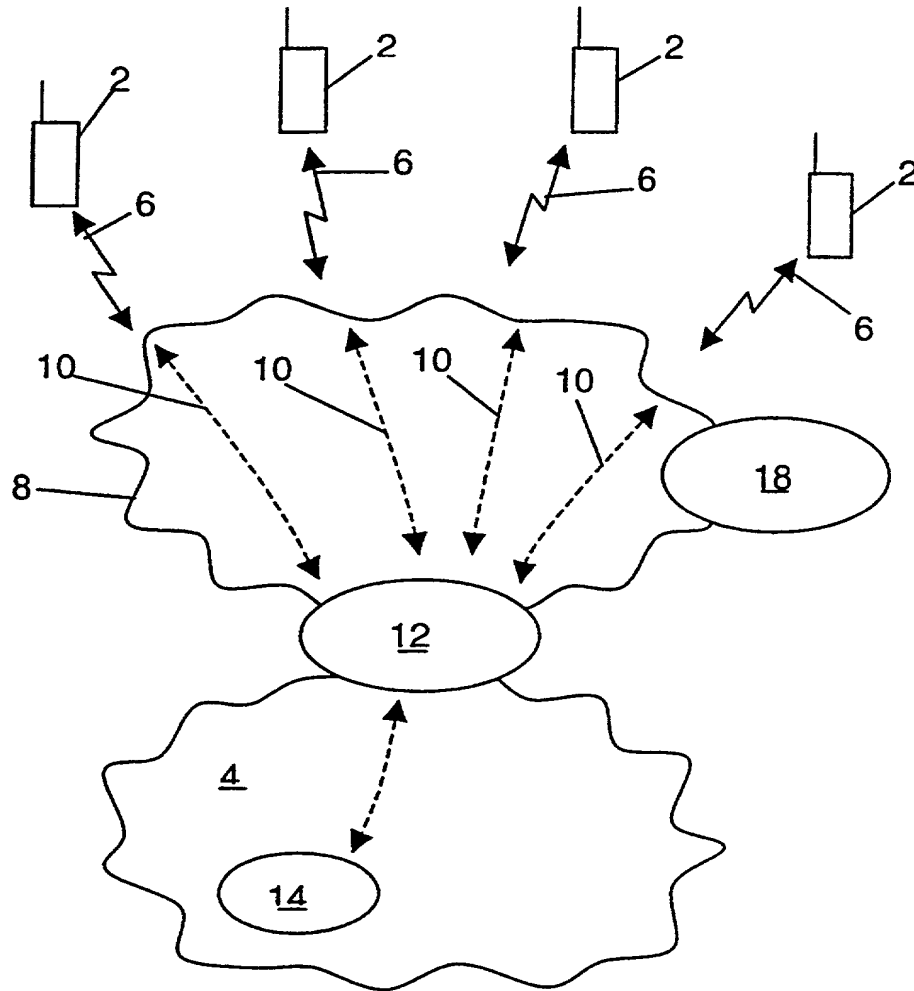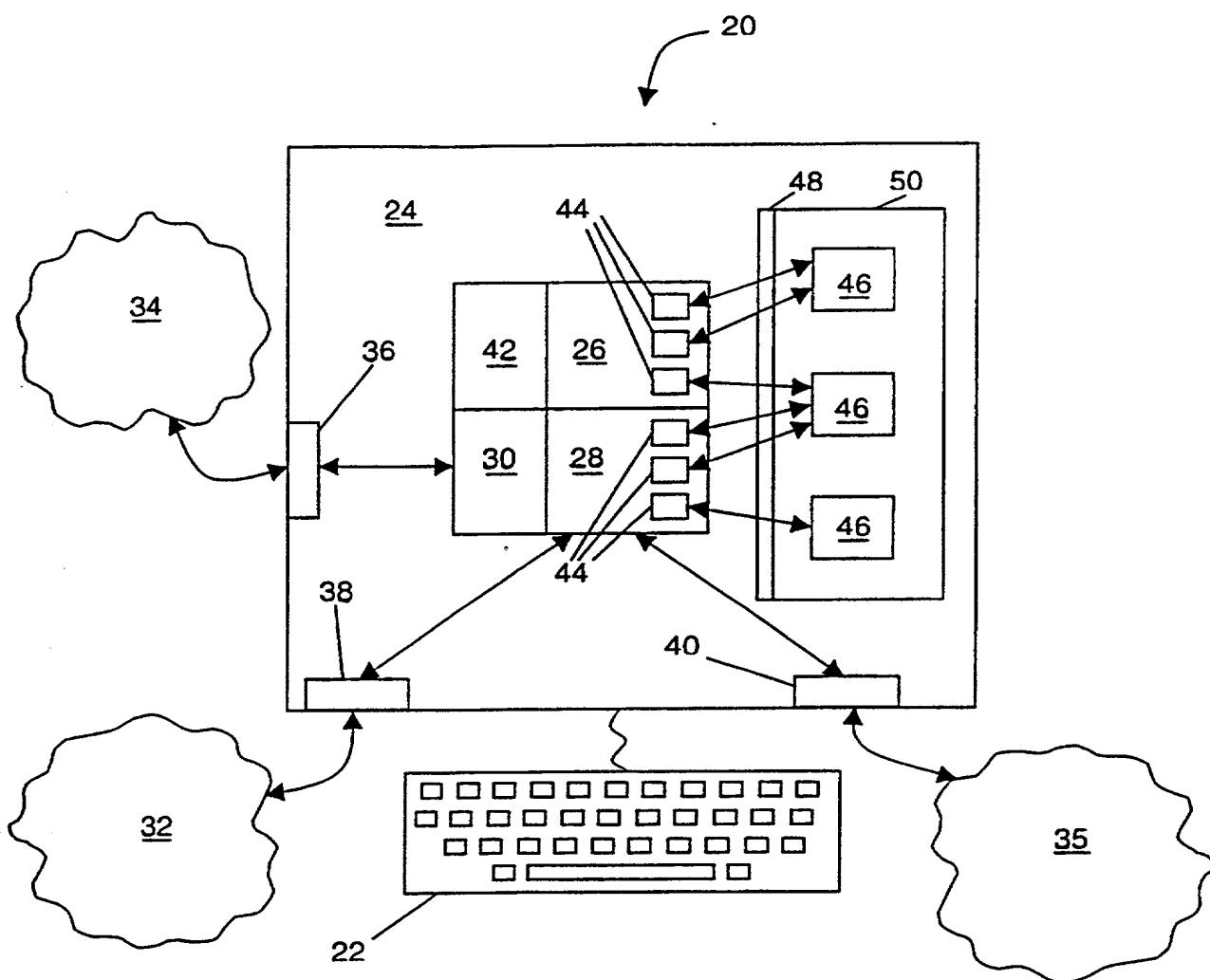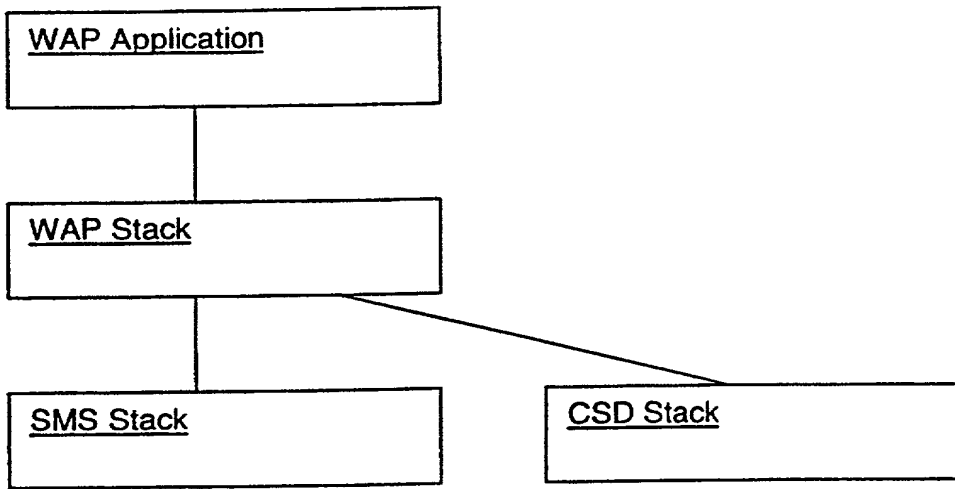
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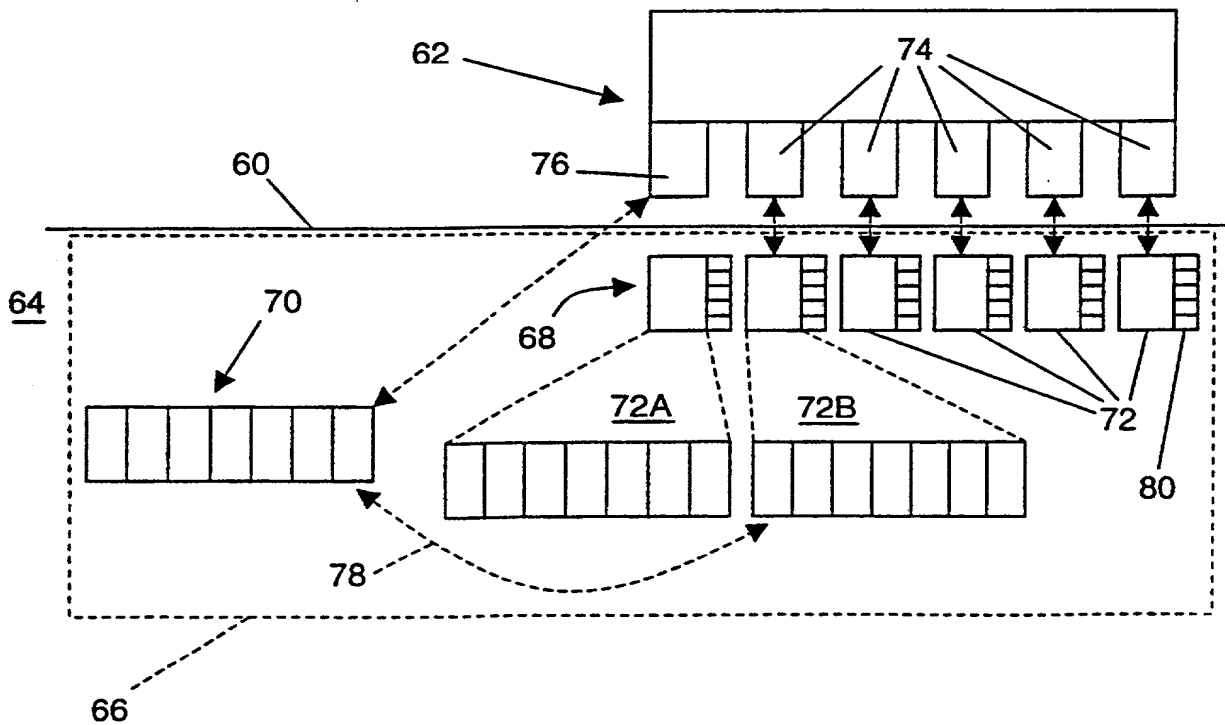Fig. 1

Fig. 2

3/3

Fig. 3

Fig. 4

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Title: **Session Management**

the specification of which

(check one)

☐   is attached hereto.

☒ ·   was filed on   as United States Application No. **10/019,330**   or PCT

International Application Number **PCT/FI00/00572** filed on **22 June 2000**

·   and was amended on (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International Application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

(Number)	(Country)	(Day/Month/Year Filed)	Priority Not Claimed
991451	**Finland**	**24 June 1999**	☐
			☐
			☐
			☐

Page 1 of 4

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

_____
(Application Serial No.)   (Filing Date)

_____
(Application Serial No.)   (Filing Date)

_____
(Application Serial No.:   (Filing Date)

I hereby claim the benefit under 35 U.S.C. Section 120 of any United States application(s), or Section 365(c) of any PCT International Application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International Application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C.F.R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

_____   _____
(Application Serial No.)   (Filing Date)   (Status)
                                                                 (patented, pending, abandoned)

_____   _____
(Application Serial No.)   (Filing Date)   (Status)
                                                                 (patented, pending, abandoned)

_____   _____
(Application Serial No.)   (Filing Date)   (Status)
                                                                 (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of third inventor:	
Third Inventor's signature:	DATE
Residence address:	
Citizenship:	
Post Office Address:	

Full name of fourth inventor:	
Fourth inventor's signature:	DATE
Residence address:	
Citizenship:	
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Full name of fifth inventor:	
Fifth inventor's signature:	DATE
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☐ Check here if additional pages are attached.   Number of added pages: Page 4 0f 4

Docket No.: _____

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Title: **Session Management**

the specification of which

(check one)

☐   is attached hereto.

☒ ·   was filed on   as United States Application No.**10/019,330**   or PCT

       International Application Number **PCT/FI00/00572**   filed on **22 June 2000**

   ·   and was amended on (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International Application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

(Number)	(Country)	(Day/Month/Year Filed)	Priority Not Claimed
991451	Finland	24 June 1999	☐
			☐
			☐
			☐

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I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

_____
(Application Serial No.)   (Filing Date)

_____
(Application Serial No.)   (Filing Date)

_____
(Application Serial No.:   (Filing Date)

I hereby claim the benefit under 35 U.S.C. Section 120 of any United States application(s), or Section 365(c) of any PCT International Application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International Application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C.F.R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

_____   _____
(Application Serial No.)   (Filing Date)   (Status)
                                                            (patented, pending, abandoned)

_____   (Status)
(Application Serial No.)   (Filing Date)   (patented, pending, abandoned)

_____   _____
(Application Serial No.)   (Filing Date)   (Status)
                                                            (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

All attorneys listed under Customer No.: 2512

Send Correspondence to:

Customer No.: 2512

Direct Telephone Calls to: (name and telephone number)
Clarence A. Green, Reg. No.: 24,622   (203) 259-1800

Full name of sole or first inventor: **Mihály TOTH**	
Sole or first inventor's signature:	DATE
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Citizenship: **Hungarian**	
Post Office Address: **Baross u. 36/C, Budapest 1203, Hungary**	

Full name of second inventor: **Eduardo CASAIS**	
Second inventor's signature:	DATE 29 th January 2002
Residence address: **Espoo, Finland**	
Citizenship: **Swiss**	
Post Office Address: **Visamäki 5 G 60, FIN-01230 Espoo, Finland**	

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

All attorneys listed under Customer No.: 2512

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Full name of sole or first inventor: **Mihály TOTH**	
Sole or first inventor's signature:	DATE
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Citizenship: **Swiss**	
Post Office Address: **Visamäki 5 G 60, FIN-01230 Espoo, Finland**	

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Full name of third inventor:

Third Inventor's signature:	DATE

Residence address:

Citizenship:

Post Office Address:

Full name of fourth inventor:

Fourth inventor's signature:	DATE

Residence address:

Citizenship:

Post Office Address:

Full name of fifth inventor:

Fifth inventor's signature:	DATE

Residence address:

Citizenship:

Post Office Address:

☐ Check here if additional pages are attached.   Number of added pages: